ELECTRONIC FUNDS TRANSFER (EFT) AND ITS USE IN THE NAVY

Patrick Paul Valenty

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

ELECTRONIC FUNDS TRANSFER (EFT)
AND ITS USE IN THE NAVY

by

Patrick Paul Valenty Jr.

June 1979

Thesis Advisors: E.A. Fincke
J.W. Creighton

Approved for public release; distribution unlimited.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Electronic Funds Transfer (EFT) and Its Use in the Navy		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; June 1979 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Patrick Paul Valenty Jr.		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE June 1979 13. NUMBER OF PAGES 59
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Electronic Funds Transfer
EFT

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The application of Electronic Funds Transfer (EFT), a new technology, and its potential use in the U.S. Navy is examined. The present payments system is reviewed and found to be performing satisfactorily as far as consumers are concerned. However, business, government and financial institutions see opportunities for reducing costs and improving services, given new technology and changes in banking regulations.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

(Page 1)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

#20 - ABSTRACT - CONTINUED

The EFT system is described along with the climate for changing the current payment system, suggesting the existence of a fertile base for growth of EFT in the Navy. Accordingly, implementation of EFT at a naval field activity is simulated, showing that significant dollar savings and payee service benefits can be realized. Since consumer acceptance of EFT is vital for its implementation, an analysis is made of a survey given to payees who have accepted EFT.

Approved for public release; distribution unlimited.

Electronic Funds Transfer (EFT) and Its Use in the Navy

by

Patrick Paul Valenty Jr.
Lieutenant Commander, Supply Corps, United States Navy
B.S., Naval Postgraduate School, 1972

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

June 1979

ABSTRACT

The application of Electronic Funds Transfer (EFT), a new technology, and its potential use in the U.S. Navy is examined. The present payments system is reviewed and found to be performing satisfactorily as far as consumers are concerned. However, business, government and financial institutions see opportunities for reducing costs and improving services, given new technology and changes in banking regulations.

The EFT system is described along with the climate for changing the current payment system, suggesting the existence of a fertile base for growth of EFT in the Navy. Accordingly, implementation of EFT at a naval field activity is simulated, showing that significant dollar savings and payee service benefits can be realized. Since consumer acceptance of EFT is vital for its implementation, an analysis is made of a survey given to payees who have accepted EFT.

TABLE OF CONTENTS

I. INTRODUCTION ---------- 7

A. PURPOSE ---------- 7

B. SCOPE ---------- 7

II. REVIEW OF ELECTRONIC FUNDS TRANSFER (EFT) ------ 9

A. BACKGROUND ---------- 9

B. EFT TECHNOLOGY ASSESSMENT ---------- 14

1. Current Payments System ---------- 15

2. Forces and Obstacles ---------- 20

3. Plan for Change - Basic Issues --------- 27

4. EFT Appraisal ---------- 35

III. NAVY FINANCIAL SYSTEM CHANGES ---------- 37

A. DISCUSSION ---------- 37

B. PRESENT PAYROLL PROCESSING SYSTEM ---------- 37

C. EFT PAYROLL PROCESSING SYSTEM ---------- 39

D. TOTAL SYSTEM CHANGES ---------- 39

IV. CONSUMER INTERESTS ---------- 43

A. PURPOSE ---------- 43

B. SURVEY ANALYSIS ---------- 43

C. SURVEY CONCLUSIONS ---------- 45

V. SUMMARY AND CONCLUSIONS ---------- 46

APPENDIX A: SAMPLE SURVEY LETTER OF EXPLANATION ----- 48

APPENDIX B: SAMPLE SURVEY QUESTIONNAIRE ---------- 49

APPENDIX C: SURVEY TEST RESULTS ---------- 50

GLOSSARY ---------- 54

BIBLIOGRAPHY ---------- 58

INITIAL DISTRIBUTION LIST ---------- 59

I. INTRODUCTION

A. PURPOSE

Government managers in all kinds of organizations are under tremendous pressure to reduce costs and improve services at the same time. The drive to maintain or increase output using reduced resources is increasing the competition for available resources. In this environment it is imperative that government managers objectively and thoroughly examine all aspects of the organization for possible savings.

One such way is to study applications of new technology and their possible use to decrease the costs of operating organizations. This thesis examines one such new technological application called Electronic Funds Transfer (EFT). It is hoped that this thesis will assist government managers to determine the potential use of such a system and assess the impact of its value in decreasing costs without loss of service.

B. SCOPE

This thesis includes an introduction to the Electronic Funds Transfer System and provides a technology assessment of this system. The feasibility of implementing EFT at a Naval shore activity is explored and, finally, an assessment is made of a survey regarding consumer acceptance of EFT. The question of the implementation and acceptance of

Electronic Funds Transfer was approached from the aspects of a pure dollar savings to the government and possible convenience to the government employee.

This effort is based on reading and analyzing material pertaining to EFT, discussion with managers and officials in the banking and government area working on EFT programs, and the judgment of the author. This thesis is conceptual in nature and does not attempt to give specific application guides for introducing EFT into an organization.

II. REVIEW OF ELECTRONIC FUNDS TRANSFER

A. BACKGROUND

Electronic Funds Transfer (EFT) is the application of electronic technology to financial payments now made by cash and checks. While EFT will displace some cash payments, it is primarily an alternative to check payments. In many applications it displaces fund transfer instructions now made and conveyed on paper, processing and storing the instructions as it transfers funds electronically into and out of deposit accounts. Just as the electronic calculator has replaced the slide rule, EFT seems destined to displace many current check uses because electronic technology can be a more efficient, secure, convenient, and less costly method of transferring funds.

Two types of electronic or other fund transfers predominate in the U.S. economy. One flows from businesses and government to consumers, and the other is a reverse flow from consumers to businesses. Businesses and government as payors make recurring income payments for salaries, wages, commissions, interest, dividends, annuities, social security, welfare, retirement, and the like. Consumers make recurring payments such as mortgage, utility, and insurance payments, and nonrecurring payments to businesses for retail purchases.

EFT technology serves these two major payment flows in several ways. In the vernacular of EFT, the automated

clearinghouse (ACH) is the essential feature of the system for handling recurring payments initiated in large volumes. Point-of-sale (POS) terminals are the essential feature of the system for handing nonrecurring payments for consumer purchases of goods and services at merchant locations. The Federal Reserve provides operational facilities to ACH's but does not participate in POS operations. ACH's have been in operation in California since October 1974, in Atlanta since May 1974, in New England and the Upper Midwest since July 1974, in Columbus since February 1975, and in Kansas City since March 1975. Monthly volumes have reached 85,000 transactions in California, 40,000 in Georgia, and 27,000 in the Upper Midwest. In mid-1974 the National Automated Clearing House Association (NACHA) was formed with 18 charter-member regional associations, including all operating ACH's and others still in the planning phase. The number of operating ACH's has grown significantly. The purpose of NACHA is to establish rules and standards for the exchange of entries nationally among local and regional ACH's and the settlement of balances.

Basically, an ACH is a clearing facility for banks which enables banks to exchange electronic or paperless debits and credits among themselves. In other words, magnetic tapes or other computer storage media are substituted for hard copy documents.

Figure II-1 depicts the following five key participants in an ACH System:

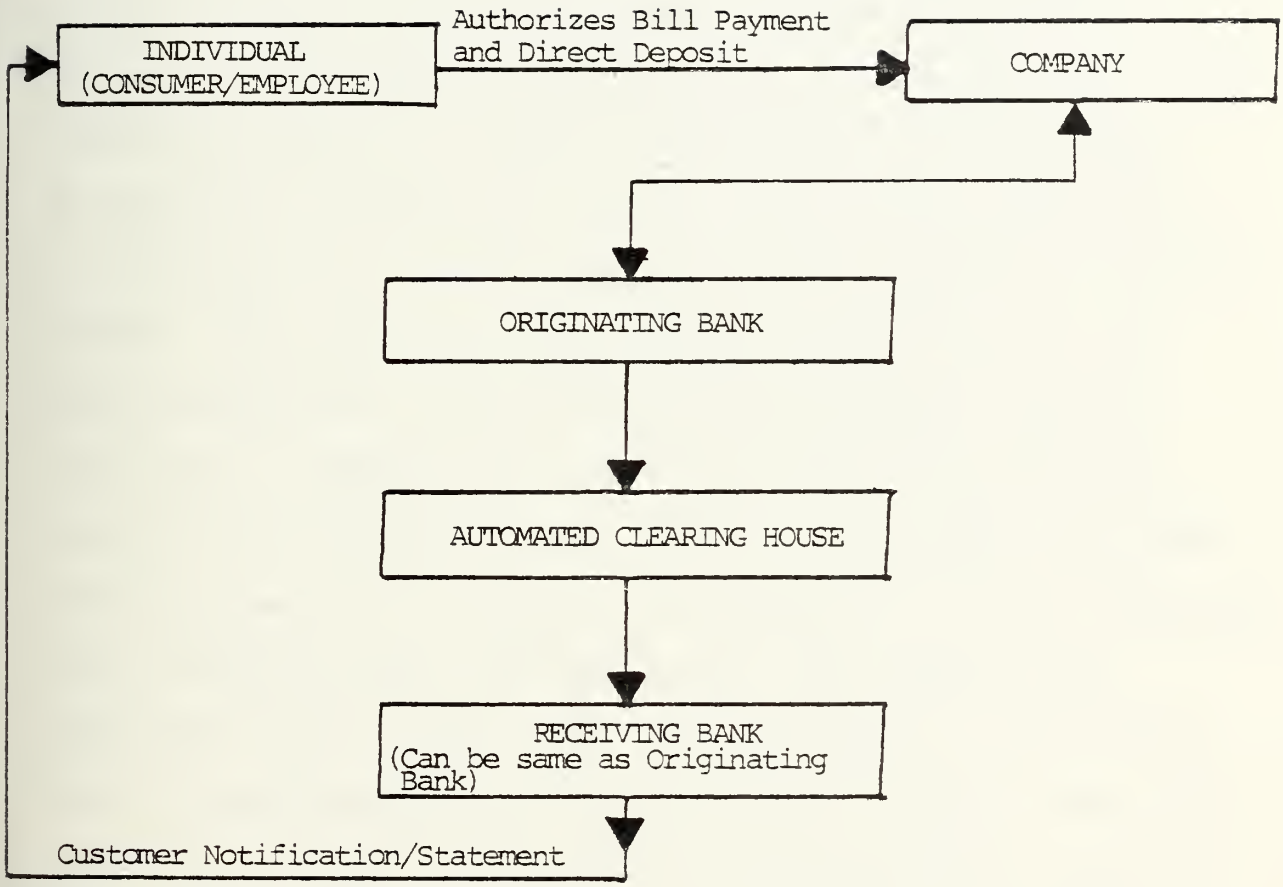

Figure II-1. Operation of Automated Clearing House System

Individual (Consumer or Employee),

Company,

Originating bank,

Automated clearinghouse, and

Receiving bank.

The individual in his role as consumer is a beneficiary of the system in that he can pre-authorize payment of recurring bills such as mortgage, utility payments and insurance premiums. The individual might also benefit as an employee by having his paycheck automatically deposited in any bank of his choice using EFT direct deposit of payroll method. These services are currently offered by participating depositary institutions utilizing Federal Reserve facilities. Companies are involved because they generate the bills for goods and services consumed by their customers and they generate the payroll disbursements to their employees. The originating bank receives inputs from companies and transforms these inputs into a form acceptable to the automated clearinghouse, which is the central facility that distributes all paperless entries to the proper receiving bank. The receiving banks essentially post (debit or credit) the paperless entries to the accounts of their customers.

ACH operations parallel check-clearing operations in many respects. There is however, a fundamental difference as already noted. In an ACH operations the instructions to transfer funds are made and exchanged on magnetic tape

instead of on paper checks. The Federal Reserve plays similar roles in helping to effect both check and EFT payments. Federal Reserve Banks operating ACH's receive ACH payment instructions on tapes from any member bank and from any member of an ACH association. Federal Reserve Banks deliver these private-sector transactions to member banks and members of the ACH associations under Treasury and Federal Reserve guidelines, making use of established arrangements for check delivery and pick-up. For recurring Federal payments the Federal Reserve acts as the fiscal agent for the government and, in this role, provides clearing, settlement, and delivery functions under rules established in cooperation with the Treasury Department. Strict Federal Reserve and Treasury time schedules are affecting a Navy activity's recent efforts to implement EFT for its civilian payroll. In order to meet Federal Reserve/Treasury deadlines the activity is adjusting its payroll processing schedule to allow the tapes to be submitted to the ACH about one half a day earlier than the current schedule would allow.

An electronic POS system is designed to permit a merchant's customers to pay, through the computer terminal in the store, for goods or services they buy in the store. Payment is made by electronically transmitting a message from the terminal at the merchant's counter to a computer in a depositary institution participating in the local POS system. The POS terminal may also provide an information service such

as verifying or guaranteeing a check or authorizing drawing on a pre-established line of credit. The POS process is initiated, and guided, by presentation at the point of sale of a plastic card that can be "read" by the merchant's terminal.

Most POS terminals are expected to be installed at cash registers. One such effort in the Navy was instituted at the Navy Supply Center, Charleston, S.C. in March of 1975. The system called Electronic Point of Sales (EPOS) was developed to achieve the following goals: "improve retail customer services, record demands at the point of sale, provide visibility of retail assets; develop an automated replenishment system, develop an automated customer billing system, and finally to develop ability to handle multiple retail outlets. Today, the EPOS System is operating extremely well with future capabilities being developed to take wall to wall inventories in less time and with increased accuracy". [Signal, 1975]

B. EFT TECHNOLOGY ASSESSMENT

This thesis deals with the possible consequences of the introduction of Electronic Funds Transfer (EFT) in the Governmental payroll system. One of the fundamental reasons for making change is to improve an existing method of operations. This section describes the present payments system, discusses the technology issues leading to the basic question, "Should there be change?", and delineates

primary issues and concerns that have been expressed with regard to the EFT developments under way. In conclusion this section expresses some near term expectations for EFT in the Navy.

1. Current Payments System

At the present time, the significant media for making payment in the United States are cash (currency and coins), checks and credit cards. The latter, of course, cannot be used directly for effecting payments but they can provide a substitute for cash and a means for aggregating into a single payment what might otherwise be a number of cash or check payments.

a. Cash

Cash is used to settle the vast majority of all financial transactions conducted in the United States. Most of these transactions, however, are small; and the total value of all payments made in cash is but a minor fraction of the total value transferred by checks and credit cards.

In the conduct of small transactions, cash is a highly efficient medium. Its costs per transaction are still far below the costs of any competing means. Cash will probably be with us for a long time because of the psychological security of carrying money. Cash is not without disadvantages. The most obvious of these is the danger of theft. The necessity for having the exact change available when boarding mass transportation vehicles in a number of our cities, the limitations of size of bills that cab drivers

are willing to accept, the frequency of robberies of filling stations, food markets, etc., all furnish evidence that there are some occupations, and physical locations, in which use of cash can be hazardous for the payer and even more often for the recipient. An alternative payments medium, provided its cost and inconvenience to users were not excessive, could win many adherents.

b. Checks

The operation of our current check payments and clearing system is probably the source of greatest concern to those who fear degradation in our present payments mechanisms. Each business day, over 100 million checks are processed, and the trend toward still greater use appears to be continuing unabated. Studies by the Bank Administration Institute (BAI) indicate that there are growing signs of inefficiencies and errors in the check processing system. Fortunately, these have not led to degradation in the performance of the system, since they are remedied within the banking system.

Nevertheless, the use of checks has its deficiencies. In the first place, checks are relatively expensive to use. This cost has been hidden from the end consumers by banks offering free or under-priced checking services. Although check system costs are insignificant when the amounts transferred per check are large, when check amounts are small, which is the case in the vast majority of transactions, these

costs are significant. Less expensive alternatives for this component appear quite desirable.

In addition to costs, checks have other deficiencies. Like cash, they are subject to theft. This is of special concern with regard to welfare payment checks mailed to recipients or Department of Defense retired pay checks mailed to retirees. Problems here are compounded by a perceived lack of reliability in mail delivery. Delays can result in large numbers of inquiries and the need to respond to these adds to the payroll operations costs.

Another area of concern with checks is the amount of float their use creates. Float can be described in two parts. The first is termed "transit float", which is the time spent in processing a check from its point of entry in the banking system until it is posted as a debit to the writer's account. The current system also has a "delay float", which represents the time in the mail (for those checks that are mailed) after a writer has prepared the check but before it arrives at the bank of first deposit. Since one man's float is another's receivable, float in the entire system will balance out. However its existence is considered to be detrimental to monetary control activities because money in float is money unavailable for use. Therefore, additional funds must be borrowed to replace money in float. Costs of these loans are reflected in price structures, discount practices and individual attitudes towards payment mechanisms.

Since some float must be accepted as a fact of life, the goal should be to minimize the amount of dollars in float. Probably one of the largest float problems can be attributed to the U.S. federal government. The federal government has a cash flow which is larger and more complex than, but conceptually the same as, any private business enterprise. The well publicized national debt is the result of borrowing by the public sector against funds held by the private sector in order to meet governmental financial needs of the former. Like all debts, there is a related interest expense (a major component of the total federal budget), and better cash management is seen as a means of reducing total budget outlays by reducing the related costs of borrowing. EFT can minimize float by vastly reducing the time required to deliver, clear and process government checks.

c. Credit Cards

Credit cards are a form of payment medium. The cards have provided significant convenience to users, and card system concepts furnish the basis for possible major payments system changes in the future. The primary cost weakness of credit cards has been the large credit losses suffered by the card issuers and the high costs of credit verification that have been necessary to keep these losses under control. The high credit loss rate is at least partly the result of indiscriminate distribution of cards without

adequate credit checking. High credit verification costs must be reduced drastically by the major credit card issuers. The plastic card, with auxiliary identification procedures, can be viewed simply as a means of entry into the developing, but as yet incompletely specified, systems for credit verification, bill postings and fund transfers. It is a vital component in the plans of those who seek to substitute such systems for cash and checks at points of sale.

In summary, the present payments media have definite weaknesses, system participants would like to see changes. The weaknesses are most critical in the handling of transactions of what might be termed medium value, that is, larger than those for which cash will continue to furnish the most efficient and popular medium, but smaller than those for which the check is a very acceptable instrument. These weaknesses, however, are in no way great enough to explain the level of attention now being paid to new payment mechanisms. The present system performs sufficiently well that only a small minority of participants have a strong and active interest in change. The strongest push for new systems is by those who see opportunities for changes in business or social practices arising from the use of new media and those who recognize new needs that are just beginning to emerge.

2. Forces and Obstacles

The current payments system is the result of an evolutionary process that has been going on for many years. This evolution stemmed from dissatisfactions with earlier systems and procedures, along with cultural and technological opportunities for change that were economically profitable to financial institutions and/or merchants. This section will view the current system in terms of satisfactions and dissatisfactions, since these clearly will influence both the method and rapidity of a change in the payments system.

a. Consumers

Partly as a result of marketing efforts by banks to increase their deposits and customers, consumers have generally grown to like and use checks. Use of checking accounts varies considerably among socioeconomic status groups, being much more common in the upper levels. The availability of "free" checking services permits people to utilize them intensively. Checks are a convenient way to pay bills or current purchases and entail less risk than carrying cash. Checking accounts presently afford a high degree of individual control over payments and furnish a permanent record of personal accounting. The sequential statements issued by some banks have proven very popular. These sequential statements enable the customer to easily reconcile the account statement with the check register. Checks are prenumbered and the statement lists separately

in numerical order all checks which have been paid, giving the date and amount of each transaction.

Consumers currently have little fear that personal data will be compromised. In general, there is adequate local capability to convert personal checks into cash at either banks or stores where the individual is known. The variety of payment mechanisms available, such as banks and others offering payment related services, create a sense of considerable choice on the part of consumers, which they value highly.

The process of preparing checks is recognized as time consuming, as will be indicated in a later section. Postage costs begin to have economic impact when large numbers of checks are written and subsequently mailed. There is some concern with the risk of loss or theft of cash and checks (and a major concern in government). Checks are not easy to cash when one is away from home, a fact that led to the development of travelers' checks and also contributed to the growth in use of national credit cards.

In summary, consumers now have a great deal of choice about the kinds of financial transactions they use. The ability to choose makes them happy with the present system. The following quote is from the summary of the results of a series of depth interviews carried out in 1970 by Brand, Gruber, Stander & Co. for the Monetary and Payment Systems Planning Committee (MAPS):

"The chief result among consumers is that there is no reason to depart from checks. First checks are not regarded as inconvenient. The amount of labor is minor, the charges are relatively low, and the cost of stamps and envelopes is hardly considered. From an objective point of view, the major benefit of a new payments system for consumers would lie in eliminating the inconvenience of checks. The fact that consumers do not regard checks as inconvenient leads to the finding that a revised payments system holds no benefit from the customer's point of view."

If the consumer is satisfied with the present system who will then lead the major change to EFT? There are three prime benefactors that can cause the present system to be exploited, in essence be changed; general business, the government, and finally financial institutions. Each of them can have a serious impact on the present system. None of them share the consumers happiness with the present system.

b. General Business

The present payments system enables business to take at least some advantage of float in all their financial transactions, especially if a business has a high volume of accounts payable payments outstanding. It also provides to business many of the satisfactions that it offers individual consumers: control over payments, basic financial records, and little fear that financial data will be compromised. Finally, a set of familiar and acceptable

business practices has gradually evolved covering all aspects of the present payments system which are documented in federal and state banking regulations and business procedures.

On the other hand, many employers must handle large amounts of cash for payroll and/or provide employees with time-off for cashing their paychecks. Significant costs are associated with payroll distribution, and employers are recognizing that these could be decreased by an electronic payments system. They also are recognizing that banking service costs and their own clerical and accounting costs could be reduced by more automated systems. Finally, the risk of loss, fraud, and theft might be decreased by new systems.

Additionally, general business is always concerned with timely collection of receivables and with planning cash management. In both of these areas, it would welcome any mechanisms that would speed payments and give business better data with which to anticipate receipts and thereby improve its financial planning. A number of business sectors (such as insurance companies and utilities) handle enormous numbers of mailed billings and would benefit from systems that simplified or reduced the costs involved, provided other aspects of customer-business relationships were not adversely affected.

In summary, business's have a system that is working adequately, but they recognize that definite reductions in costs are potentially available through greater automation.

c. Government

As the country's largest employer, the government is well aware of the costs of payroll distribution by current methods and is encouraging many government employees to accept a preauthorized deposit system. As an example; the U.S. Treasury's Direct Deposit Program presently includes the following types of Federal recurring payments; regular Social Security (SSA), Supplemental Security Income (SSI), Civil Service (CSC) retirement payments, Railroad Retirement (RRB), Revenue Sharing (ORS), and Veterans Compensation and Pension (VA) with a total monthly volume of 43,152,284 payments. The EFT portion of this Direct Deposit Program was 9,680,827 payments during March 1979. This amounts to 22.4 percent participation and a dollar volume of $2.7 billion. Other examples include activities such as the U.S. Air Force which currently issues its active duty and retired pay by direct deposit-EFT. AS of March 1979 the volume of direct deposit-EFT payments amounts to 77% participation of active-duty personnel and 68% participation of retired personnel. On May 30, 1978 the U.S. Navy issued its first payment under the Direct Deposit-EFT System for military retirees. As of March 1979 the volume of direct deposit-EFT payments

amounted to 27% participation of all retired personnel [Department of Treasury letter of March 1979].

Crimes of cash robbery, fraud, counterfeiting, forgery, and significant thefts of social security and welfare checks are additional reasons why the government is pressing for change in the present system. Also, from the viewpoint of monetary control, the present system has significant float to be managed. If this could be reduced, it would make for more effective and responsive control by the Federal Reserve Board.

In summary, it can be said that the federal government is already taking major actions to change the current system, both through its regulatory activities (Federal Reserve Board and Treasury Department) and through its dealings with its own employees.

d. Financial Institutions

Commercial banks are the primary operators of the current payments system. Next in terms of importance are the thrift institutions such as savings and loan associations, mutual savings banks and credit unions. It is the commercial banks, however, who are providing the impetus for change. There are several reasons for this. First, the total cost for operating the overall payments system is rising, particularly check processing. Secondly, the deteriorating quality of the processing system along with the changes implemented by the Federal Reserve System to

speed payment operations tend to make error reconciliation difficult and are squeezing out float.

More recently, commercial banks have become increasingly active in developing systems that use EFT techniques. Most of these initiatives, however, are not the result of a broad base of dissatisfaction with current procedures, but derive from either the efforts of some "market leaders" among the commercial banks or the results of competition from other depository institutions. It would appear that they hope to extend their shares of the commercial banking market and to extend commercial banking's interest in other activities authorized under the Bank Holding Company Act. This Act encourages banks, particularly large ones, to move in the direction of becoming a form of financial conglomerate by allowing them to establish a range of banking activities beyond the borders of their states of origin. The best known of these banks are CITIBANK, Chase Manhattan Bank, and Bank of America, but a host of other commercial banks, including such moderate sized organizations as the City National Bank of Columbus, Ohio and the Hempstead Bank of Long Island, have experimented with a variety of innovative payment/collection methods.

In summary, the simplest explanation for the widespread interest in new forms of payment transaction methods is that it is a direct result of our competitive business system. The competition is fueled by burgeoning of a wide variety of new technological possibilities and the

opportunities generated by changes in the traditional system of regulation and market division. Thus, competitive activity rather than dissatisfaction is providing the stimulus for action.

3. Plan for Change - Basic Issues

The first part of this work introduced the Electronic Funds Transfer (EFT) System and the elements and components in the system. This section will describe the primary issues and concerns that have been expressed with regard to the many EFT developments underway.

a. Control of Automated Entry Devices

The basic issue here concerns who will control and manage the automated devices that might serve as entry points for EFT transactions. The question arises in a minor way in connection with the various customers sharing of automated tellers in the clearing house but becomes a major issue when point-of-sale and related devices are considered. Who will own these devices and who will operate them? Who will establish charges for their use? What forms of regulation if any will be imposed? And most importantly, who will accept liability for errors, breakdowns, fraudulent usage, theft and related sources of financial loss? The issue derives its importance from the fact that, if these devices become widely accepted and popular, anyone unable to acquire or employ them on favorable competitive terms will be at a disadvantage in the market.

A recent article in Bankers Magazine (March/April 1978) by Mr. Dominic DiSario, Jr., noted that making the move into EFT demands planning of a high order. The following advice was given by the author, "Establish your EFT goals and objectives early. Consider which EFT services are best for your bank and community. Determine if your bank has the resources to introduce and maintain the EFT services you wish to offer. Consider if your bank is in a position to establish an orderly and carefully structured EFT service implementation program."

b. Control of Communications Networks and Clearing Operations

This issue centers on who will control the various types of networks and associated clearing operations and how this management will be conducted. The primary questions are: Who will be allowed direct access to the system? Who will be excluded, and what basis for exclusion will be employed?

The oldest nationwide communications systems currently in operation that have direct roles in funds transfer are the Fed Wire and the Bank Wire; the former is completely under the control and operation of the Federal Reserve System, and the latter is controlled by a managing committee of owner-bank directors and operated under contract. Also, each of the national bank credit card organizations has implemented a nationwide communications network to speed credit authorization inquires and responses between merchants

and consumer files at member banks or associations. So long as each of these systems operates independently, communicating only among member merchants and member banks of the separate credit card organizations, no issues of entry or control are likely to arise. However, if the use of these devices by the customers of several financial institutions becomes commonplace, and particularly if customers can use devices at points distant from their homes, some means for interconnecting them will be required.

e. Attitudes and Requirements of Business

The issue here concerns the extent to which the interests of financial institutions and those of retail merchants coincide with regard to connecting what are now internal retail store systems into a broader-based payments system network. This question has at least two very important elements:

The first element is whether agreement can be reached on mechanisms that will permit the retail merchant to maintain the type of customer relationships he views as critical to his business, including the use of his credit operations as a marketing tool, without posing conditions that are unacceptable to the financial institutions.

A second consideration is the extent to which the banks' potential savings generated from moving to an electronic system will be shared with merchants and consumers.

While concerns will vary from one merchant to another, and from one type of retail outlet to another, an

excellent general summary for department/discount stores was provided in a speech given by Richard Kerr, of Federated Department Stores. At the 1973 annual convention of the Charge Account Bankers Division of the ABA, Mr. Kerr made the following observations:

- "Major retail outlets have no reason to believe that use of a national bank card or national independent card will give them any business they are not getting with their own cards; most of their business is local, so joining a national system has no marketing advantage.

- "Major retail outlets believe that most credit worthy customers interested in their type of store have already established credit with them, so none of the bank-sponsored systems is apt to add to their local customer list.

- "Merchants suspect that their attitudes toward credit differ so greatly from the banks' that there is little compatibility in their motivations. Store customers use credit primarily as a convenience and secondarily as a means of financing needs. Credit is valuable as a marketing tool but is not considered a direct source of profit at many stores. Most stores are satisfied with their capabilities to offer the forms of credit they want to provide at a reasonable cost.

- "Finally, use of bank and independent card plans may cause retailers to lose identification with their customers and weaken their ability to retain their loyalty.

Store marketing efforts may be limited if they no longer have the demographic information contained in store customer credit applications and historical records of customer purchases."

d. Individual Attitudes

The critical issue involving individuals concerns what they want, at what price, and under what conditions. Any move toward replacing cash and check transactions with EFT technology eventually requires consumer co-operation if government fiat is not employed. Consumers tend to be satisfied with the preseny system and have shown little enthusiasm for change.

A number of efforts have been made to encourage consumers to accept pre-authorized deposits and payments. In the case of deposits, data from the U.S. Treasury suggest that the large majority of U.S. Government personnel still prefer to be paid by checks drawn in their favor, rather than in favor of a financial organization. (See later comments on government EFT programs in Section 4 of this section.)

There are a number of consumer concerns as have been indicated earlier. Customer attitudes toward changes in the payments system are generally those of suspicion. The presumption is that changes will benefit those who propose them, or such proposals would never have been made. Few services have been offered which are perceived as gains to the consumer, while in a number of areas the consumer

could be the loser - in his control of float, control of his finances, security of his financial records, the ability to withhold payment until satisfied with goods purchased, etc. Until these ambiguities appear to be solved the consumer will probably not have confidence in the system.

e. Government Attitudes

The primary issue for Government concerns its role and the steps which it should take to encourage, discourage, limit, or shape the development of a future system. The need for an improved payments system is recognized by operating entities, such as the Treasury and Federal Reserve Board (FRB), because of the high overall costs and risks or errors in the present system and the inefficiencies of the relatively high float that arise due to existing system characteristics. Transit delay float for example was estimated several years ago at 120 billion dollars [Golembe, 1971], and much of this could be eliminated in an improved system.

At the present time, the primary components of government that exhibit interest in changing the payments system are:

- The Federal Reserve Board, which recognizes the need for greater transaction efficiency, lower system costs, and more rapid transaction processes so that smaller float will result from our payments system;

- The Justice Department, which, through its Antitrust Division, is watching developments closely to

assure that equitable and appropriate levels of competition are retained as systems start to evolve;

- The Treasury Department, which has significant interests in reducing the costs of current government production and distribution of checks for payroll and other purposes; and

- The Social Security Administration and other federal and local organizations concerned with making recurrent payments that have too often been lost, stolen, or delayed in the mails.

Areas of concern as delineated above deal with how the current system can be improved to become more efficient in costs and also in some cases to require less float. An additional and more general concern is the compatibility among various elements of an electronic funds system. For example, in dealing with this compatibility the following questions arise. Is it necessary for customers to carry dozens of different cards or keys to enter the system? What happens if merchants will not agree to have a half dozen different terminals at their counters for essentially the same purpose? And finally, will banks accept the time and expense required for customized information exchanges among many different subsystems?

The issue of compatibility could be placed under the subject of standards, one of the means for achieving compatibility. Standardization or other means for achieving compatibility is, however, contingent on a consensus about

the desirability of compatibility. Standardization activities are pursued in a number of ways by various organizations. Government regulators, component manufacturers, industry associations, and sometimes consumer representatives get together on committees to deliberate methods and standards of change. However, long delays can result by this method due to the participants attempting to foresee all circumstances that can develop. Continued involvement of the American National Standards Institute through its Banking System Committee is only one example that is absolutely necessary to insure an orderly progression to a complete EFT system.

The foregoing section suggests that if major changes arise in our payments system, they will not be the result of intense dissatisfactions with current operations. For each user or provider component, there are aspects that are not completely satisfactory, but the evolutionary pattern of past payments system growth has permitted essentially all participants to adjust to the current environment. The wide variety of choices inherent in the present system makes this a relatively straightforward process. As commented earlier, the pressures for change are arising not from failures of the present system, but from opportunities perceived by market leaders in a number of types of financial institutions and other businesses. Their actions, in turn, are inspiring intra- and inter-institutional competitive responses. In the process, the various dissatisfactions with the current

system potentially can be exploited in offering new services. Current satisfactions set a minimum level on the range, character, cost and quality required of new service offerings and present practical and psychological barriers to change that the innovators will have to overcome if they are to be successful. Possible changes to the payments system, almost all involving greater automation and/or use of electronic communications networks, have been under discussion almost continually during the past decade.

4. EFT Appraisal

From the historical standpoint, EFT is approximately ten years old. During this period the emphasis has been the technology, the participants and the rules the system will follow. The foregoing sections indicate that ample technology exists, who most of the participants will be and what procedures should be followed to take advantage of the EFT system. With this fertile base for growth, what is the future applicability to the Navy? How can EFT be utilized in the Navy's Financial Management System?

To date the most significant accomplishment in the Navy's efforts to convert to EFT is that the Navy Finance Center (NAVFINCEN), Cleveland, Ohio is currently processing retiree payments directly to financial organizations via the Treasury's Direct Deposit EFT Program. Although a voluntary program, approximately 27% of the retired personnel are now participating in the EFT program.

The Navy already has all the essential elements of the EFT system in a program called "Pay Deposit it Quicker" (PDQ). This is a Navy-wide program designed to provide an opportunity for Civilian and Military members to have their net pay checks deposited directly to a financial organization of their choice, using composite check procedures to the greatest extent possible. However, what would be the impact if the entire Navy Civilian and Military payroll was on EFT? While research to answer this question is beyond the scope of this thesis, the impact of EFT on one Navy organization is addressed in Part III. A Navy organization charged with the responsibility for payment of approximately 8,000 civilian employees will be considered for conversion from the present system to a total EFT system. The operational changes as well as the financial changes that resulted will be noted.

As noted in the previous sections, the consumer is one of the most important participants in the implementation of EFT. No program can be successful unless feedback from its customers is evaluated. Part IV will gauge the results of a survey mailed to the retired pay customers of the Navy's Retired Pay System.

III. NAVY FINANCIAL SYSTEM CHANGES

A. DISCUSSION

The purpose of this section is to examine the changes that take place when a naval activity implements Electronic Funds Transfer in the organization. Two primary functions will be covered in this examination; the Payroll Computation/ Data Processing functions and the Disbursing Function.

B. PRESENT PAYROLL PROCESSING SYSTEM

Figure III-1 is a Payroll System General Flow Chart from the Comptroller Manual at a naval installation responsible for the civilian payroll processing for about 8,000 employees. The Pay 010 Program is the major program in the payroll system. The program computes the gross pay and reduces it to net pay. It updates the Payroll Master File, creates a Labor Reconciliation File, and a payroll work tape that is passed to subsidiary programs that produce numerous other payroll reports. The Pay 20 and Pay 25 Programs print the individual check/earning statements and also the direct deposit composite checks. The checks/ earnings statements are then bursted and forwarded for EAM processing. This processing consists of punching net pay and distribution codes into the checks and earnings statements and putting both into distribution code sequence.

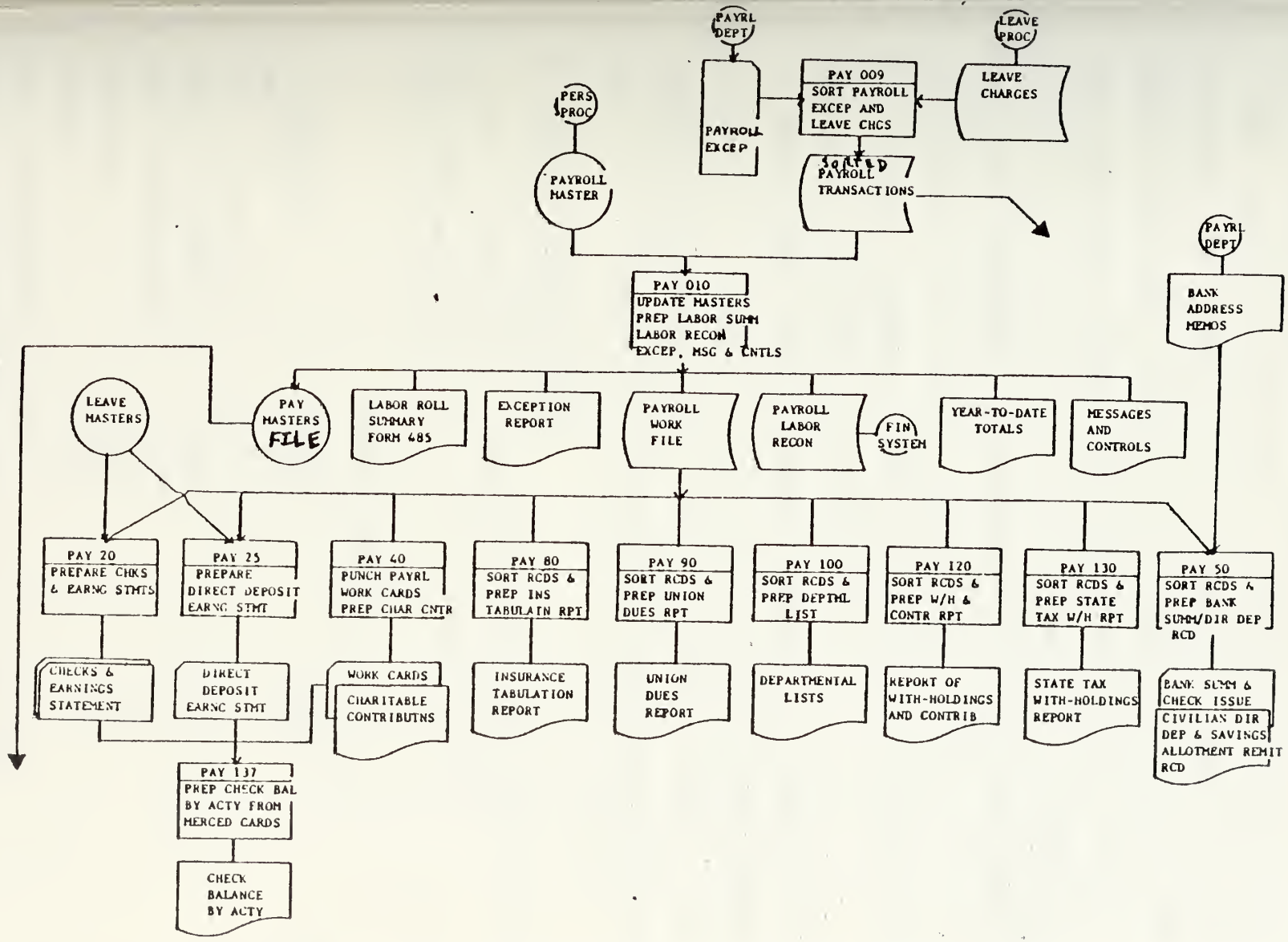

FIGURE III-1. Payroll System General Flow Chart Before EFT

C. EFT PAYROLL PROCESSING SYSTEM

What happens to the Payroll System should the activity implement EFT? Figure III-2 is a modified Payroll System General Flow Chart. Note that the Pay 20, 25 and 137 programs have been deleted and a new program called "create EFT Tape" has been created. This tape will be programmed utilizing the latest instructions of the Treasury Department and forwarded to a Federal Reserve Bank to begin processing to a regional clearing house then on to the financial institutions as designed by the employees.

The primary change in the disbursing area would be the reduction of checks that are used. In the present disbursing system approximately 8,000 checks a month are used. Under EFT, this procedure is eliminated and no checks are prepared.

D. TOTAL SYSTEM CHANGES

In the organization described above the changes resulting from the implementation of EFT are shown below:

	SYSTEM CHANGES		
FUNCTION	BEFORE	AFTER	SAVINGS
IBM 1401	10 HRS	0	$160
IBM 188 Collator	10 HRS	0	120
IBM 083 Sorter	10 HRS	0	90
IBM 519 Reproducer	5 HRS	0	70
Bursters	25 HRS	0	80
Checks	8,000	0	80
TOTAL SAVINGS PER PAY PERIOD			$600
TOTAL SAVINGS PER YEAR ($600 x 26 PAY PERIODS)			$15,600
NEW SYSTEM PROGRAMMING AND STARTUP COSTS			$600
SAVINGS FIRST YEAR			$15,000

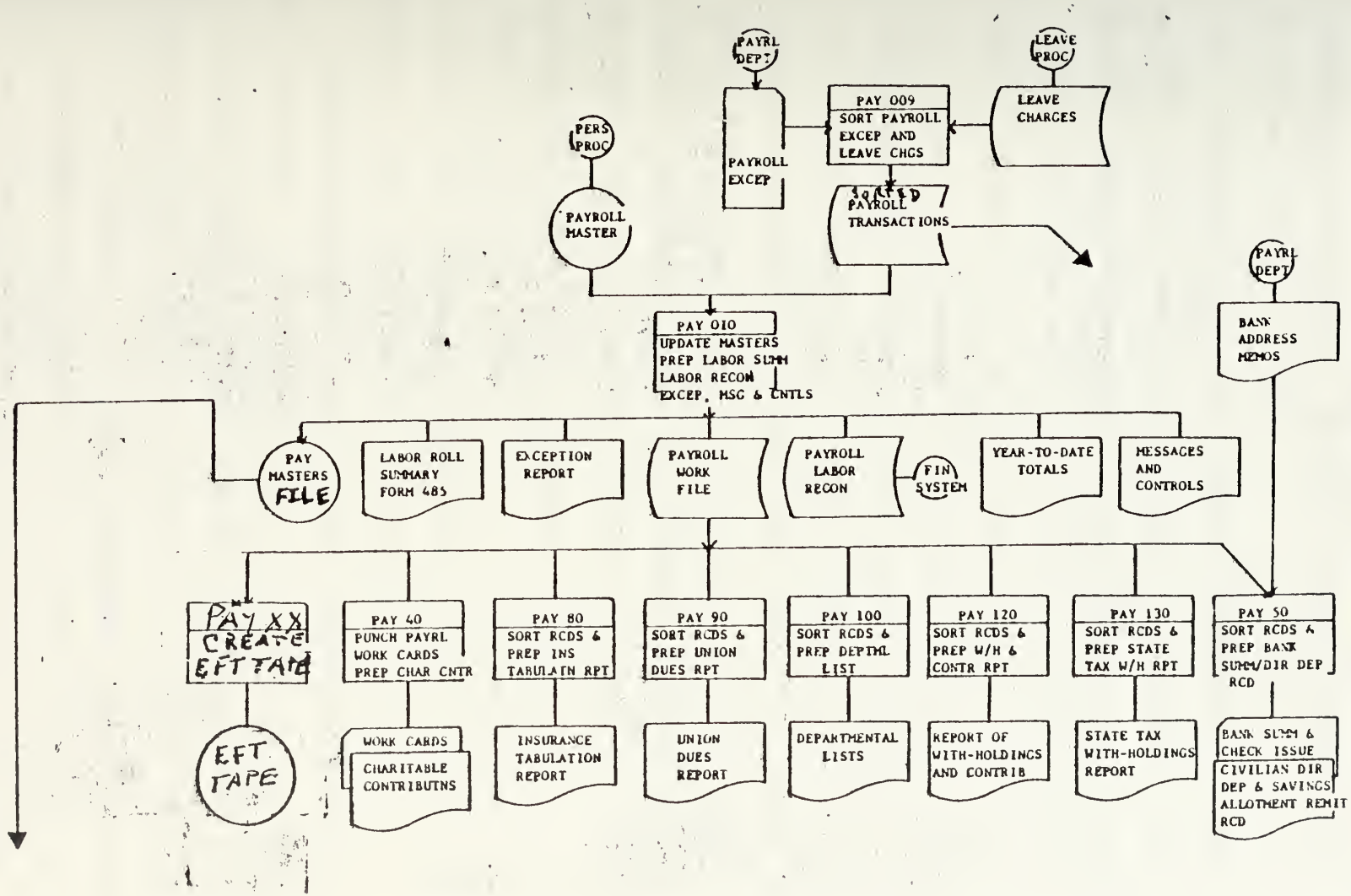

FIGURE III-2. Payroll System General Flow Chart After EFT

As noted above the elimination of checks and the bursting and EAM processing costs are the primary savings in the implementation of EFT. It should also be emphasized that the implementation of EFT can be accomplished in an easy fast time frame with very limited startup cost. Once set up there are no ongoing additional maintenance costs and the new system becomes part of the payroll master program.

Cost reduction under EFT amounted to approximately $15,600.00 per year. Savings for the entire Navy could be significant, considering the Navy has 64 payroll offices responsible for 290,000 civilian payroll accounts. But perhaps the greatest benefits are to the employees. EFT eliminates the possibility of the checks being lost or, in the case of the PDQ program delayed in the mail. As an example, under the present system, if a member or banks reports that the check was not received it may take weeks to trace the problem through the post office and for the Treasury to issue a duplicate. Under EFT, if a member's account is not credited, the financial organization can go back to the EFT tape and find the problem in a matter of minutes.

Other advantages utilizing the EFT system should also be considered. The concept of having one payroll office or regional payroll offices located throughout the United States could be a means of achieving an overall cost effective payroll system. Civilian companies such as Manpower Inc. pay their employees by check through the mail from a central accounting and disbursing activity. With the

installation of a computer-to-computer link between centralized and decentralized activities an up to date payroll system could be achieved. However, difficult consumer-oriented decisions must be made concerning elimination of cash paydays and check payments by mail in favor of direct EFT deposit to payees' accounts. The survey results in Part IV suggest that payees on EFT like it because of the reliability of the system.

IV. CONSUMER INTERESTS

A. PURPOSE

The consumer will play an important role in the acceptance of EFT. Accordingly, this section analyzes results of a survey given to consumers who have accepted EFT. The purpose of the survey was to determine their reasons for choosing EFT.

B. SURVEY ANALYSIS

The survey was accomplished with the cooperation of the Navy Finance Center, Cleveland, Ohio (NAVFINCEN). On about 18 April 1979 the survey forms as shown in Appendices A and B were mailed to a sample of 5,300 Navy retirees. These retirees recently had converted to the EFT program instead of having their checks sent directly to their homes. They were asked to rank the following reasons for their choosing EFT:

a. EFT eliminates the possibility of my checks being lost, stolen, forged, or destroyed in delivery.

b. EFT eliminates the possibility of postal delays for any reason.

c. EFT eliminates the inconvenience of cashing and depositing my check.

d. EFT guarantees the deposit of my retired pay on a regular schedule.

e. EFT guarantees the delivery, deposit, and availability of my retired pay while I travel.

f. Other reasons: _____

Five Hundred responses are tabulated in Table IV-1.

REASONS FOR ACCEPTANCE	RANKINGS OF RESPONSES 1	2	3	4	5	6
a.	273	92	63	41	31	--
b.	55	119	140	124	58	4
c.	69	89	82	90	168	2
d.	45	125	130	142	58	--
e.	54	73	81	101	181	10
f.	4	2	4	2	4	484

TABLE IV-1

The results of the survey were analyzed to determine whether the members of the sample thought that some of the characteristics or the reasons for acceptance of EFT were more important than others. The hypothesis that there was no agreement among the members as to which characteristics were most important was tested using Kendall's Coefficient of Concordance: W. [Siegel]

This statistic is designed to test the hypothesis of no agreement by comparing the ranks assigned to the various classes of things over the entire sample. Beacause of the large sample size the statistic may be treated as approximately Chi-squared. The hypothesis was rejected at a significant level well beyond .001 as shown in Appendix C. Thus, we may conclude that there is in fact agreement among

the sampled members as to which characteristics are most important.

C. SURVEY CONCLUSIONS

Table IV-1 makes it readily apparent that reason "a" (EFT eliminates the possibility of my checks being lost, stolen, forged, or destroyed in delivery) was in fact the most popular EFT characteristic chosen by the retirees. It was ranked the most important on 273 out of 500 survey forms. The least popular characteristics of EFT were described in reasons "c" (EFT eliminates the inconvenience of cashing and depositing my check) and "e" (EFT guarantees the delivery, deposit and availability of my retired pay while I travel).

V. SUMMARY AND CONCLUSIONS

In assessing the application of Electronic Funds Transfer (EFT) for the Navy's use this work has included an introduction to the Electronic Funds Transfer System, which includes an explanation of the Current Payments System and its most significant media for making payment; cash, checks and credit cards. It has been shown that the present payment media has definite weaknesses but performs sufficiently well that only a small minority of participants have a strong and active interest in change. Consumers now have a great deal of choice about the kinds of financial transactions they use. This ability to choose makes them content with the present system. However, there are three prime benefactors that can cause the present system to be exploited: general business, the government and financial institutions. Each of them can have a serious impact on the present system and none of them shares the consumers contentment with the present system. But, the simplest explanation for the widespread interest in new forms of payment transaction methods is that it is a direct result of our competitive business system. Thus, competitive activity rather than dissatisfaction is providing the stimulus for action.

In assessing this technological change some primary issues and concerns with regard to EFT developments have been explored such as, control of automated entry devices,

control of communications networks and clearing operations, and finally, the attitudes and requirements of business, individuals and government. This technology assessment suggests that if major changes arise in our payment system, they will not be the result of intense dissatisfaction with current payment operations, but from opportunities perceived by market leaders in a number of types of financial institutions and other businesses.

The simulated implementation of EFT at a naval activity has shown that significant dollar savings and payee benefits can be realized. However, difficult consumer-oriented decisions must be made concerning elimination of cash paydays and check payment by mail in favor of direct EFT deposit to payee's accounts. The result of a survey given to consumers who have accepted EFT indicates that the most popular EFT characteristic is the reliability of the system.

In conclusion, the time is right for change. Both significant dollar savings and increased service can be realized from the EFT system. The technology exists with others, such as the Federal Government through the Treasury and Federal Reserve. The Navy should seriously commit resources to developing EFT systems in order to join others in reaping the benefits of this new technology.

APPENDIX A

TWO-SIDED "IBM" CARD

FOR PERSONNEL NOW TAKING ADVANTAGE OF EFT:

Dear Retiree:

Recently, the Navy instituted an improved method of delivery of retired pay utilizing the Treasury's "Electronic Funds Transfer" system, called EFT for short. Under this system, you have your retired pay transmitted by electronic means directly to a financial organization of your choice (bank, credit union, or savings and loan association). Under EFT, you are assured that your payment will not be late, lost, or stolen. Also your pay goes directly to your account regardless of whether you are home or away from home. In addition, the Government saves the cost of postage and on the cost of preparing and processing individual checks. Accordingly, EFT

(OVER)

serves both the retiree and the Government.

In processing your retired account we note, with pleasure, that you have availed yourself of this improved service. Since this is a relatively new program, the purpose of this notice is to determine why you have taken advantage of this method of getting paid. Accordingly, we would appreciate your taking the time to fill out the additional enclosed questionnaire and return it to us in the envelope provided.

Your efforts to assist the Navy in evaluating the EFT payment program are appreciated.

Sincerely,

RETIRED PAY DEPARTMENT, NAVY FINANCE CENTER, CLEVELAND, OHIO 44199
TELEPHONE: (216) 522-5955

APPENDIX B

"IBM CARD"

PAY GRADE UPON RETIREMENT _____ AGE UPON RETIREMENT _____

MONTH AND YEAR OF RETIREMENT _____

1. Why did you choose EFT? Please rank (1,2,etc) in order of importance to you.

RANK

a.____ EFT eliminates the possibility of my checks being lost, stolen, forged or destroyed in delivery.

b.____ EFT eliminates the possibility of postal delays for whatever reason.

c.____ EFT eliminates the inconvenience in cashing and deposit of my check.

d.____ EFT guarantees the deposit of my retired pay on a regular schedule.

e.____ EFT guarantees the delivery, deposit and availability of my retired pay while I travel.

f.____ Other reasons:

APPENDIX C

Survey test using the KENDALL Coefficient of Concordance: W

H_0: No agreement by comparing ranks

H_1: Otherwise, there is agreement among sampled members

W, the Coefficient of Concordance, is a measure of the degree of variability among the rankings assigned by the k retirees as reflected by the sum of the squares of differences between the observed rank sum and the rank sum that would be observed if there was no agreement among the retirees. The statistic tests the hypothesis that there is no agreement among the retirees.

The test is performed by computing the rank sum that would be observed if there were no agreement among the k individuals who provided rankings then comparing that rank sum to the observed rank sum for each of the entities being ranked. The procedure is as follows:

If there were no agreement among the retirees each of the ranked entities would receive each rank approximately the same number of times. Thus the expected rank sum for each entity would be

$$\frac{1+2+3+\ldots+N}{N} \times K = \frac{N(N+1)}{2} \times \frac{K}{N} .$$

For this sample K = 500, N = 6. Therefore, the expected rank sum is

$$\frac{6 \times 7}{2} \times \frac{500}{6} = 1750 \ .$$

The actual rank sum for each entity is then computed by adding all the assigned ranks for each entity as shown in Table C-1 below.

REASONS FOR ACCEPTANCE	RANKINGS OF RESPONSES 1	2	3	4	5	6
a.	273	92	63	41	31	--
b.	55	119	140	124	58	4
c.	69	89	82	90	168	2
d.	45	125	130	142	58	--
e.	54	73	81	101	181	10
f.	4	2	4	2	4	484

TABLE C-1

RANK SUM COMPUTATION:

a = 273(1) + 92(2) + 63(3) + 41(4) + 31(5) + 0(6) = 965

b = 55(1) + 119(2) + 140(3) + 124(4) + 58(5) + 4(6) = 1523

c = 69(1) + 89(2) + 82(3) + 90(4) + 168(5) + 2(6) = 1705

d = 45(1) + 125(2) + 130(3) + 142(4) + 58(5) + 0(6) = 1543

e = 54(1) + 73(2) + 81(3) + 101(5) + 181(5) + 10(6) = 1812

f = 4(1) + 2(2) + 4(3) + 2(5) + 4(5) + 484(6) = 2952

The observed rank sum for each entity is then compared to the expected rank sum, the difference between the two is squared, and the squared differences are summed, as shown below:

$$s = (965-1750)^2 + (1523-1750)^2 + (1705-1750)^2 + (1543-1750)^2 + (1812-1750)^2 + (2952-1750)^2$$

$$= (785)^2 + (227)^2 + (45)^2 + (207)^2 + (62)^2 + (1202)^2$$

$$= 616225 + 51529 + 2025 + 42849 + 3844 + 1444804$$

$$= 2,161,276 .$$

The resulting statistic s is then used to calculate a statistic whose distribution is known.

For small number of rankings (N less than 7) and small samples (k less than 20) the statistic W is computed as follows:

$$W = \frac{s}{\frac{1}{12} k^2 (N^3 - N)}$$

For large number of ranks or large number of sample sizes the statistic s is converted to a chi squared statistic as follows:

$$\text{Chi square} = \frac{12s}{k\ N(N+1)}$$

In either event the computed statistic is compared to appropriate tables and if the statistic is too big the hypothesis of no agreement is rejected at an appropriate level of significance.

In this case the Chi squared statistic is 1235.015 with 5 degrees of freedom which is significant well beyond the .001 level. Therefore, the hypothesis is rejected.

GLOSSARY

The field of EFT is replete with special terminology, acronyms and familiar sounding words used in unfamiliar ways. To aid readers who have not had prior contact with the subject, the following glossary is presented below. In preparing this glossary definitions have been heavily relied on from prior glossaries prepared by the Federal Deposit Insurance Corporation and the Federal Reserve Bank of Cleveland.

Automated Clearing House (ACH)

A computerized facility used by member depository institutions to process, i.e., combine, sort and distribute, payment orders in machine-readable form (computer tapes or punched cards).

Bank Credit Card

A credit card issued by a bank.

Batch Processing Systems

A system in which data are collected over a period of time, aggregated, and processed in a group.

Check Authorization/Verification

An inquiry process undertaken to reduce the risk of accepting a fraudulent check or a check written for an amount which exceeds the account balance. Check authorization systems may be provided and maintained

by the party accepting the check, by a financial institution, or by a third party engaged in such a business. These systems may be designed to access bank records directly or may rely on secondary data sources. In some systems, a check approval may be accompanied by a guarantee of payment.

Clearing and Settlement

Refers to the process whereby checks or other records of financial or point-of-sale transactions are moved (physically or electronically) from the point at which they were originated to the organization (bank, thrift institution or other organization) which keeps the accounts for and expects to collect from and account to, the responsible payer. The settlement process completes the internal financial transactions among the (possibly) many parties involved in the clearing operation.

Composite Check

A listing of payments to be made from an account, sent by the owner of the account to his depository with instructions to effect the payments and debit his account for the total amount. The payments are transmitted by the depository institution to the creditors, for subsequent deposit by them in their accounts.

Credit Card

A card (usually plastic) which identifies the holder of a charge account. Credit cards may contain the name and address of the card holder, the name of the creditor,

the charge account number, an expiration date, and information about businesses which have agreed to accept payment from the card issuing organization for goods or services provided to the card holder.

Direct Deposit of Payroll

A payroll system in which employee earnings are deposited directly to the employee's account at a depository institution in lieu of payment by cash or check.

Electronic Funds Transfer System(s) (EFTS)

A term, used loosely, to describe computerized systems which process financial transactions or process information about financial transactions, or which effect an exchange of value between two parties.

Float

Funds which have been credited to one account before they have been debited from another account, and therefore are temporarily credited to two accounts.

NOW Account (Negotiable Order of Withdrawal)

A time deposit account which permits the account holder to write negotiable orders for withdrawal (similar to a check).

Overdraft

A deposit withdrawal for an amount in excess of the current account balance. Some institutions will process such a transaction and will automatically extend a loan for the overdraft amounts.

Share Drafts

An order to pay written to a third party by a credit union member against funds on a deposit with the credit union, cleared through a commercial bank as a payable-through draft.

BIBLIOGRAPHY

1. American Bankers Association, "A Digest of Electronic Funds Transfer Systems," American Bankers Association, 1974.

2. Brand, Gruber, Stander & Co., "Report to the Monetary and Payment Systems Planning Committee," Washington, D.C., 1979.

3. Department of Treasury Fiscal Service, "Operations Planning and Research Staff Report of March 1979, Washington, D.C., 1979.

4. DiSario, D., Jr., "On-Line EFT Terminals--A Phased Implementation Approach," Bankers Magazine, pp. 32-40, March/April 1978.

5. Golembe, C.H., "Bank Float in a New Payments System," Carter H. Golembe Associates, Inc., Washington, D.C., 1971.

6. National Commission on Electronic Fund Transfers, "EFT and the Public Interest," February, 1977.

7. Niblack, W.C., "Development of Electronic Funds Transfer Systems," The Government Accountants Journal, pp. 24-33, Winter 1976-77.

8. Reistad, D.L., "EFTS '78--Where We're Going," Bankers Magazine, pp. 24-25, March/April 1978.

9. Siegel, S., Nonparametric Statistics for the Behavioral Sciences, pp. 229-238, McGraw-Hill Book Co., 1956.

10. Signal, L.S., "EPOS--A Futuristic SERVMART Approach," Navy Supply Corps Newsletter, pp. 4-5, December 1975.

11. Smith, E.F., "Electronic Banking," Bankers Magazine, p. 4, July, 1978.

12. Valenty, P.P., Jr., "Electronic Fund Transfer--Exploring the Dynamics of a New Technology," unpublished paper, Naval Postgraduate School, November, 1978.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Documentation Center Cameron Station Alexandria, Virginia 22314	2
2.	Library, Code 0142 Naval Postgraduate School Monterey, California 93940	2
3.	Department Chairman, Code 54 Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940	1
4.	Professor John W. Creighton 54Cf Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940	1
5.	CDR Edwin A. Fincke, SC, USN 54Fi Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940	1
6.	LCDR Patrick P. Valenty Jr., SC, USN CO MSC PAC Oakland, California 94625	3
7.	CDR David K. McClurkin, SC, USN Navy Finance Center (EFT) Anthony J. Celebreze Federal Building Cleveland, Ohio 44199	1
8.	Commanding Officer Military Sealift Command, Pacific Oakland, California 94625	1
9.	Defense Logistics Studies Information Exchange U.S. Army Logistics Management Center Fort Lee, Virginia 23801	1

Thesis
V1325
c.1

Valenty
Electronic funds
transfer (EFT) and
its use in the Navy.

183870